

# Rain Birds



## Lesson: Rain Birds

**Level:** Intermediate

## Objectives:

- 1) The students will create and learn about four different types of triangles- right, equilateral, isosceles, and scalene.
- 2) The students will use appropriate tools to make accurate measurements of side lengths and angle measures of triangles.

## Materials:

GPS receivers  
Field Sheets  
Teacher Map  
Student Map  
Balls of string  
Meter sticks or measuring tape  
Tents stakes (or something like them, i.e. pencils)

### Math:

NM-GEO.3-8.1, 8.4

#### *Geometry*

- Students will analyze characteristics of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.
- Students will use visualization, spatial reasoning, and geometric modeling to solve problems.

### Language Arts:

NL-ENG.K-12.9

#### *Multicultural Understanding*

- Students develop an understanding of and respect for diversity in language use, patterns, and dialects across cultures, ethnic groups, geographic regions, and social roles.

### Social Studies:

NSS-G.K-12.2

#### *Places and Regions*

- Students will understand how culture and experience influence people's perceptions of places and regions.

### Other Standards:

NM-MEA.3-8.1, 8.2 Measurement

NM-DATA.3-8.1 Data Analysis & Probability

NM-PROB.PK-12.1, 12.2 Problem Solving

NM-PROB.COMM.PK-12.1-12.4 Communication

NM-PROB.CNN-PK-12.1 Connections

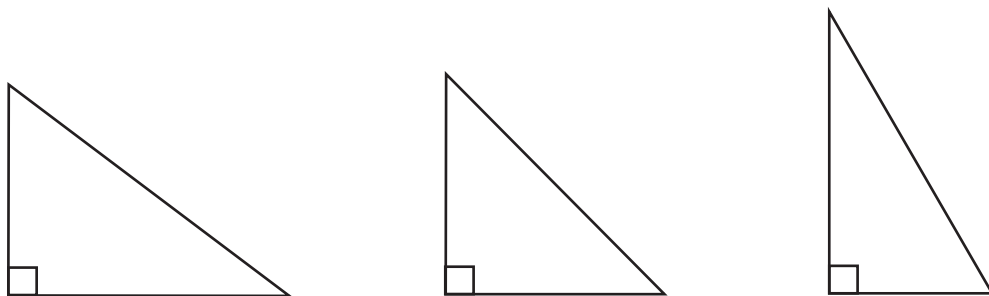
NM-PROB.REP.PK-12.1 Representation

## Procedures:

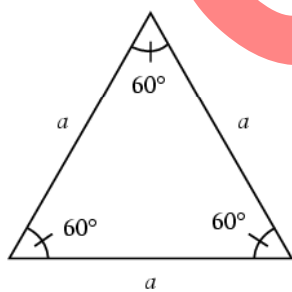
### Getting Ready:

In this lesson, the students will learn about the Zuni Pueblo Native Americans, a tribe that live in a very dry area of the Southwest United States and a symbol that the Zunis would use in their pottery design to call for much needed rain. See the background story below to use with your students. There are no waypoints for you to map out ahead of time. The students will need an understanding of how to input coordinates into a GPSr and will need a general knowledge of 4 types of triangles – right, equilateral, isosceles, and scalene triangles.

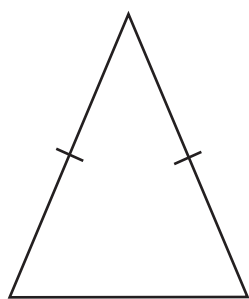
*Right Triangle* – a triangle containing one right angle measuring  $90^\circ$



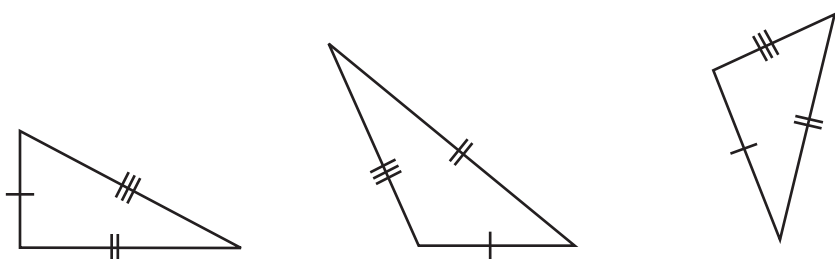
*Equilateral Triangle* – a triangle that has 3 sides of equal length, and, consequently has all equal angle measures



*Isosceles Triangle* – a triangle that has 2 sides of equal length

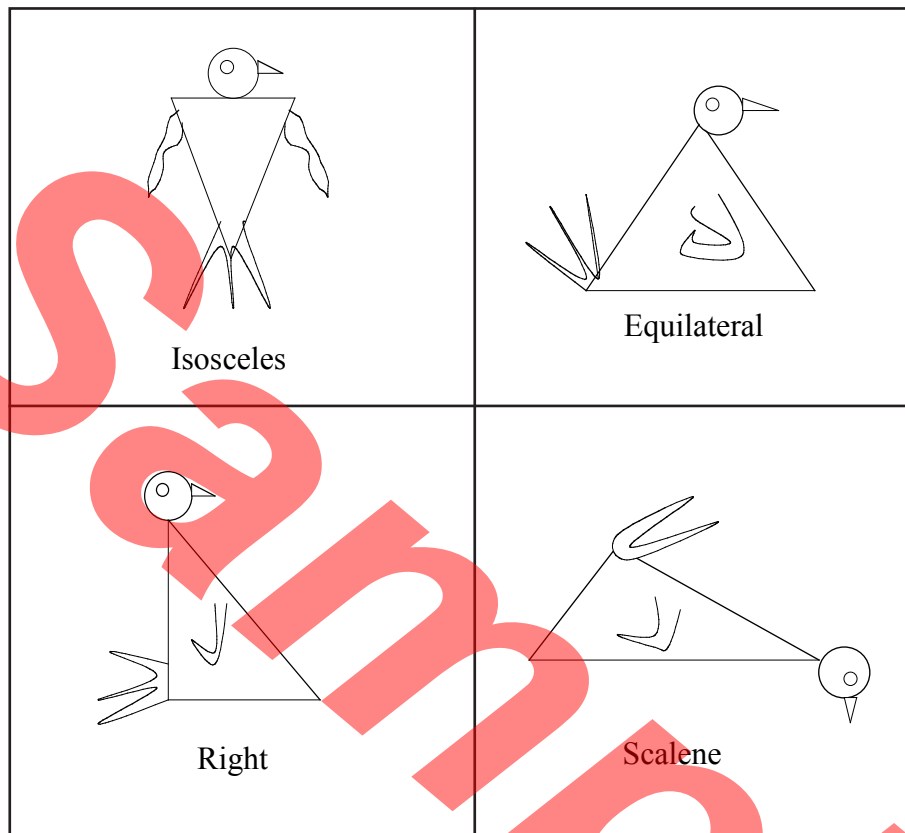


*Scalene Triangle* – a triangle that has 3 sides of different length and 3 different angle measures



Assemble the students into groups and assign a type of triangle to each group. Try to have around an even amount of each type. You will then draw examples on the board of different rain birds using the four types of triangles. Explain the properties of the triangles as you draw them.

Examples:



### The Story of the Rain Birds:

The Zunis (zoo-nees) are one of the many Pueblo tribes that still survive today in New Mexico and Arizona. Because they live in such a dry area, rain is extremely important to them. The Zunis believed in an important symbol, known as the rain bird, which they used in designing much of their pottery. The design does not look much like a real bird, but is a combination of triangles, circles, and curves. The secret of the rain bird design is in its triangle-shaped body. If the triangle is tilted a certain way, it could mean that the bird is calling for rain, happy because there is rain, or laying down due to lack of rain.

In this lesson, the students will explore the different triangles that make up rain birds and will create some of their own.

During the Educaching™ part of this lesson, the students will be going outdoors to plot their triangles on the school grounds. Using the tent stakes, string, protractors and tape measures, their job will be to stake out a large triangle that meets the requirements of the triangle they've been assigned. They will then use their GPS receiver to name the waypoints of each of the triangle's three vertices, or corners. They will mark these locations and waypoints on their student maps and draw a rough sketch of their triangle.

## Let's go Educaching™!

As the students work outside, assist them as needed. Look for their strategies to make certain sides of their triangles equal or how they are making certain angle measurements. This information should not be given to them, but they should come to the conclusion, for example, that they'll need to make sure they have two equal sides with their measuring tapes if they are creating an isosceles triangle. The students should also use their protractors and record angle measures. On their field sheets, they will record all 3 side lengths and all 3 angle measures, along with the 3 waypoints for the corners of their triangles. When all groups are finished, they clean up their tent stakes, string, and any other materials, and come back into the building.

**Back At Headquarters:** Now it's time to make their rain birds. Pass out construction paper and have the students take out their scissors and glue. You may also want craft beads and feathers to "dress" the birds up a bit. Each student will make a triangle body from construction paper that represents the triangle they created outside. They will then add a head and feathers, and any other characteristics they'd like. When finished, the birds can be mixed up and you can have the students "classify" unknown birds based on their triangle characteristics as a review of the four different triangles. You can then draw a large map of the school grounds on butcher paper and have the students post their rain birds at the exact location that they mapped them outside.



# Educaching



# Field Sheet

Name(s): \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

**Lesson: Rain Birds**

## Getting Ready

Bring maps, waypoints, tent stakes, string, a measuring devices and GPS instruction cards.

## Let's go Educaching!

Use the tables below to record your waypoints and distances between points. Once you have staked out all of your points, measure the distance between each point.

Corner A	Corner B	Corner C
N ____° ____' ____"	N ____° ____' ____"	N ____° ____' ____"
W ____° ____' ____"	W ____° ____' ____"	W ____° ____' ____"

Calculation	Answer
Distance A - B	
Distance B - C	
Distance C - A	
Type of Triangle	

## Back at Headquarters

Be prepared to use your results to create your own rain birds.